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Hiroshi Sumiyama et al.)	
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For: IMAGE FORMING APPARATUS)	Confirmation No.: 6659
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SUBMISSION OF VERIFIED TRANSLATION OF JAPANESE APPLICATION

Commissioner for Patents
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Sir:

Submitted herewith is a translation of Japanese Patent Application No. 10-16098,
together with a verification of the translation.

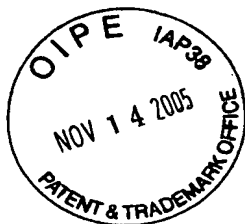
Respectfully submitted,

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DECLARATION

I, Kenichi Takata, residing at Shimizu Patent Attorneys Office of 7F Idemitsu-Nagahori Bldg., 4-26, Minamitemba 3-chome, Chuoku, Osaka, JAPAN, do hereby certify that I am conversant with the English and Japanese languages and am a competent translator thereof. I further certify that to the best of my knowledge and belief the attached English translation is a true and correct translation made by me of Japanese Patent Application No. 10-16098 filed on January 28, 1998.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 12th day of October, 2005

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Kenichi Takata

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[NAME OF THE DOCUMENT] SPECIFICATION

[TITLE OF THE INVENTION] IMAGE FORMING APPARATUS

[CLAIMS]

[CLAIM 1] An image forming apparatus, comprising:

image data storing means for storing image data;

image mode storing means for storing image forming conditions;

output means for outputting the image data stored in the image data storing means under the corresponding image forming conditions; and

image data discarding means for discarding the image data being outputted by the output means,

wherein the corresponding image forming conditions stored in the image mode storing means are kept in storing portion even if the image data being outputted is discarded by the image data discarding means.

[CLAIM 2] The image forming apparatus as recited in claim 1, further comprising reading means for reading the image data in the image data storing means, wherein the reading means and the outputting means are capable of being operated independently.

[CLAIM 3] The image forming apparatus as recited in claim 2, further comprising image mode calling means for calling the image forming conditions, wherein the image data which was discarded with the image data discarding means and again read with the reading means is outputted in priority to the output waiting image data under the corresponding image forming conditions called up with the image mode calling means.

[CLAIM 4] The image forming apparatus as recited in claim 3, wherein when the image data is discarded with the image data discarding means, if another image data is being read with the reading means, the reading operation is interrupted and the discarded image data becomes available to be reloaded.

[CLAIM 5] The image forming apparatus as recited in claim 3, wherein when the image data is discarded with the image data discarding means, if another image data is being read with the reading means,

the reading operation is continued until the completion of the reading operation and thereafter the discarded image data becomes available to be reloaded.

[CLAIM 6] The image forming apparatus as recited in claim 1 or 2, further comprising changing means for changing the stored image forming conditions.

[DETAIL DESCRIPTION OF THE INVENTION]

[0001]

[TECHNICAL FIELD OF THE INVENTION]

This invention relates to an image forming apparatus.

[0002]

[PRIOR ART]

As an image forming apparatus, as described in Japanese Unexamined Laid-open Patent Publication No. S61-62071 for example, conventionally proposed are an image forming apparatus that a user can input image forming conditions such as the number of copies and the magnifications (hereinafter may be referred to as "image mode") for a plurality of original document sets, store the image mode in storing means and delete the image mode stored in the storing means or can delete the image mode and thereafter move over the following image mode in turn.

[0003]

[Problems to be solved by the invention]

By the way, during the output of the image data, the user may wish to stop the output and discard the image data because some mistakes are found in the image data being output, or additional image data is required for the output data.

[0004]

In such a case, the conventional image forming apparatus discards both the image data being output, and the associated image mode. Accordingly, in order to output newly acquired image data, the user had to re-input the image data and re-set the image mode, which was troublesome to the user.

[0005]

The present invention was made in view of the aforementioned technical background, and aims to provide an image forming apparatus capable of using an original setting mode regarding an image mode in cases where image data being output is deleted and re-inputted image data is to be outputted.

[0006]

The aforementioned problems can be solved by an image forming apparatus, comprising image data storing means for storing image data; image mode storing means for storing image forming conditions; output means for outputting the image data stored in the image data storing means under the corresponding image forming conditions; and image data discarding means for discarding the image data being outputted by the output means, wherein the corresponding image forming conditions stored in the image mode storing means are kept in storing portion even if the image data being outputted is discarded by the image data discarding means.

[0007]

According to the image forming apparatus having the aforementioned structure, even if image data being outputted is discarded, the corresponding image mode remains as it is. Therefore, the image data can be outputted by simply re-inputting the image data without requiring resetting of the image mode.

[0008]

Such functions and effects become more effective in an image forming apparatus further comprising reading means for reading the image data in the image data storing means, and multi-job functions capable of independently operating the reading means and the outputting means.

[0009]

In cases where the image forming apparatus further comprises image mode calling means for calling the image forming conditions, wherein the image data which was discarded with the image data discarding means and again read with the reading means is outputted in priority to the output waiting image data under the corresponding

image forming conditions called up with the image mode calling means, the re-loaded image data can be obtained promptly without waiting the output of the out-put-waiting image data.

[0010]

In the case of an apparatus in which when the image data is discarded with the image data discarding means, if another image data is being read with the reading means, the reading operation is interrupted and the discarded image data becomes available to be reloaded, the discarding, re-loading and outputting of the image data can be performed consecutively.

[0011]

In the case of an apparatus in which when the image data is discarded with the image data discarding means, if another image data is being read with the reading means, the reading operation is continued until the completion of the reading operation and thereafter the discarded image data becomes available to be reloaded, it is not reload the image data that the reading was interrupted after the reloading of the discarded image data, which is efficient.

[0012]

In the cases where the image forming apparatus further comprises changing means for changing the stored image forming conditions, the stored image mode can be changed by calling up the stored image mode.

[0013]

[Embodiments of the invention]

A copying machine having a multi-job function, which is an embodiment of the present invention will be now described with reference to the attached drawings.

[0014]

Fig. 1 is a schematic cross-sectional view showing a schematic structure of a copying machine 1 having a multi-job function.

[0015]

The copying machine 1 includes, as major elements, an image reader IR for reading an original document to create image data,

a storing portion 30 for temporarily storing the image data generated by the image reader IR, together with the image mode set for the image data, a printer PRT for printing an image on a copy paper based on the image and the image mode stored in the storing portion 30, an operation panel 300 for inputting operations (which is generally provided at the top face (in the vertical direction with respect to the paper) of the copying machine 1), an original feeding portion 500 for feeding the original and turning the original over if necessary, and a paper re-supply unit 600 for inverting a copy paper on one side of which an image was already recorded and supplying the inverted copy paper to the printer PRT. These operations are controlled by a controlling portion (not shown). The controlling portion includes, e.g., a ROM storing operation programs for the copying machine 1, a CPU for executing the programs, and a RAM storing information required for the execution of the programs.

[0016]

In the original feeding portion 500, originals placed on the tray 501 are fed to the reading position on a glass stage 15 from the lower-most page, in response to a print command. After the completion of the reading with the image reader IR, the originals are ejected to the ejection tray 502.

[0017]

The image reader IR includes a scan system 10 and an image signal processing portion 20. In the scan system 10, initially, the original placed at the reading position is exposed to the exposure lamp 11 fixed to the scanner 16 which moves below the original. The reflected light from the original is inputted to the photoelectric converting elements 13 and 14 using CCD arrays or the like via the reflecting mirror and the collective lens 12. Subsequently, the signals obtained by the scan system 10 are supplied to the image signal processing portion 20 in which the signals are subjected to image processing, such as binarization, image correction, enlargement or reduction, and/or image editing.

[0018]

The processed image data is then stored in the storing portion 30.

[0019]

The printer PRT includes a print processing portion 40, an optical system 60, an imaging system 70, and a paper transporting system 80. The print processing portion 40 drives the optical system 60 based on the image data and the image mode supplied from the storing portion 30. In the optical system 60, semiconductor lasers 61 and 62 generate laser beams based on the signals controlled by the print processing portion 40. These laser beams are combined into a single beam by a dichroic mirror 63, reflected by a polygon mirror 65 which is rotated by a motor 64, and guided to a photosensitive drum 71 of the imaging system 70 via a main lens 66.

[0020]

In the imaging system 70, the photosensitive drum 71 has been electrically charged by a charger 72 in advance. The laser beam guided from the optical system 60 irradiates the charged drum 71, whereby an electrostatic latent image is formed on the photosensitive drum 71. Subsequently, a developer 73 forms a toner image on the electrostatic latent image. The toner image on the photosensitive drum 71 is transferred onto the copy paper which was supplied from the paper-supply cassette 80a or 80b of the paper transporting system 80. Thereafter, the copy paper bearing the toner image is carried by the transporting belt 81 to fixing rollers 82, by which the toner image is fixed to the copy paper with the heat and the pressure. Then, the copy paper is ejected to the discharge tray 601 of the paper re-supply unit 600.

[0021]

In this copying machine 1, both the original feeding portion 500 and the printer PRT can detect paper jam. Furthermore, the printer PRT can detect an error due to out of paper in the paper-supply cassette, and the original feeding portion 500 detects an error due to misalignment of the original at the reading position. If the copying machine stops its operation due to a fault or a breakdown,

such a fault can also be detected.

[0022]

Fig. 2 is a plan view of the structure of the operation panel 300 of the copying machine 1. A start key 301 is used to start a copy operation. A ten-key 302 is used to input any numerical value, such as the number of copies. A clear key 303 is used to clear the numerical value inputted through the ten-key, and to discard the image data in the image storing portion 30. A stop key 304 is used to stop the copy operation and/or the scan operation. A panel reset key 305 is used to discard the set image mode and job.

[0023]

An LCD 306 is provided and a touch panel is installed on the face of the LCD 306. Through the touch panel, various settings according to the displayed contents in the LCD 306 can be performed. For example, if a reservation setting key 306a is displayed on the LCD 306, a user can book a print job by simply pressing the reservation setting key 306a. The magnification of copy or other image modes can also be set through the touch panel. If an image mode call key is displayed on the LCD, a user can call up the image mode which has already been set, and can change the image mode after the calling up.

[0024]

Fig. 3 is a drawing to be used to explain the multi-jobs in the copying machine 1. Until obtaining a copy from an original set by the copying machine 1, roughly speaking, three processing are executed. The processing includes processing for scanning the original to create an image data, processing for correcting the image data and storing the corrected image data, and processing for printing based on the stored image data. The series of three processing are executed against certain original sets in the order mentioned above to thereby obtain the copy of the original sets. These three processing are performed by the image reader IR, the image storing portion 30 and the printer PRT, respectively (hereinafter, each of these "processing" may also be referred to

as "job").

The aforementioned multi-job executed by the copying machine 1 denotes, for example, reading an original set A by the image reader IR while storing an original set B different from the original set A in the storing portion 30 and further reading an original set C different from the original sets A and B, during the outputting of the original set A by the printer PRT. Thus, by this multi-job function, reading operation and the image reading operation can be performed independently.

[0025]

Because the printing operation and the reading operation are performed independently, during the two operations are being executed simultaneously, even if a trouble occurred and either the printing operation or the scanning operation is stopped, one of the operations can be continuously performed without being disturbed without stopping the other operation.

[0026]

Fig. 4 is a flowchart of the main routine executed by the CPU which controls the operations of the copying machine 1.

[0027]

When the copying machine 1 is powered on, and the CPU is reset, the program starts. First, at Step S401 (hereinafter simply referred to as "S401"), the CPU is initialized by clearing the RAM and setting up the registers. The modes of the copying machine 1 is also initialized at S402.

[0028]

Next, at S403, a built-in timer, which is installed in the CPU, is started. The built in timer defines the time length of a routine, and its value is set in advance during the initial setting.

[0029]

Subsequently, at S404, a job determination for determining the state of the current job is performed. At S405, key input control processing for controlling key inputs through the hard keys and the touch panel are performed). At S406, display control processing

for controlling the display on the LCD and LED is performed. The processing S404 through S406 are performed at subroutines, which will be described in more detail below.

[0030]

At S407, system control processing for controlling the normal operations of the copying machine 1 is performed.

[0031]

Next, at S408, image data discarding processing for discarding image data during the outputting of the image data is performed. After the discard of the image data, at S409, another image data is scanned by the image reader IR. If a command of discarding a waiting print job is generated, the waiting job is discarded at S410. Other processing are executed at S411. The processing at S408 through S410 are performed at the subroutines, the details of which will be described later.

[0032]

After the execution of the processing of S403 through S411, at S412, it is determined whether the built-in timer which was set at S403 is up. If it is discriminated that the timer is up (YES at S412), one routine is finished, and the process returns to S403. If it is discriminated that the built-in timer has not been up (NO at S412), the process stays at S412.

[0033]

Figs. 5 and 6 show flowcharts showing the subroutine of the job discrimination processing of S404 shown in Fig. 4. Here, the current job denotes a user's job which is discriminated that an operation is performed to the copying machine 1 among a plurality of jobs which are being executed by the copying machine. On the other hand, jobs other than the current job are called as sub-jobs. Here, a job is either a reading job or a print job.

[0034]

Initially, at S50, it is discriminated whether the copying machine 1 is under suspension. If not under suspension (NO at S50), at S51, it is discriminated whether reading is being performed.

If reading is being performed (YES at S51), the current job is set to "reading" at S513, and then the routine returns.

[0035]

If the copying machine 1 is not in a reading operation (NO at S51), at S511, it is discriminated whether it is in a print operation. If it is in a print operation (YES at S511), the current job is set to "print" at S512. Then, the routine returns. If not in a print operation (NO at S511), the routine returns while keeping the current job in a state before calling this routine.

[0036]

If the copying machine 1 is under suspension (YES at S50), at S52, it is discriminated whether it is a timing when an error (paper jams as mentioned above) is generated. Although the detail explanation will be omitted, in the copying machine 1, a signal showing an existence of an error will be turned on at the second when the error occurred, and a signal showing an existence of an error will be turned off at the second when the error is recovered. If it is the timing when an error occurred (YES at S52), at S521 and S523, the type of the error is discriminated.

[0037]

At S521, it is discriminated whether the error is an error at the print job. If it is an error at the print job (YES at S521), at S522, the current job is set to "print". Then the routine returns. If it is not an error at the print job (NO at S521), at S523, it is discriminated whether it is an error at the reading job. If it is an error at the reading job (YES at S523), at S524, the current job is set to "reading." Then, this routine returns. If it was not an error at the reading job (nor at the print job) (NO at S523), at S525, it is discriminated that these two errors are not errors at these two jobs but an error at the entire copying machine 1 such as a malfunction of the machine.

[0038]

If there is no error (NO at S52), it is discriminated whether a user operated the copying machine 1 at S53 (e.g., opening of the

cover, error release operations).

[0039]

When the copying machine 1 is operated (YES at S53), at S531, it is discriminated whether appropriate action is made to the error at print job. If the action is appropriate to the print job error (YES at S531), the current job is set to "print" at S532. Then, this routine returns. On the other hand, it is not appropriate to the print job error (NO at S531), at S532, it is discriminated whether an action is appropriate to reading job error. If it is appropriate to the reading job error (YES at S533), the current job is set to "reading" at S534. Then, in the same manner as the processing for a print job error, at S535, the signal showing the existence of the error is turned off. Then, this routine returns. If it is not appropriate to the reading job error (No at S533), the routine returns as it is.

[0040]

If no operation is made to the copying machine 1 (No at S53), it is discriminated what is the suspension state at S54, S541 and S55. Initially, at S54, it is discriminated whether the print operation is under suspension.

[0041]

If the print operation is under suspension (YES at S54), at S541, it is discriminated whether the reading operation of the copying machine 1 is under suspension. If the reading operation is under suspension (the print operation is also under suspension) (YES at S541), at S542, it is judged that both operations are under suspension (NO at S541), at S543, the current job is set to "print." Then, this routine returns.

[0042]

If the print operation is not under suspension (NO at S54), at S55, it is discriminated whether the reading operation is under suspension. If the reading operation is under suspension (YES at S55), at S551, the current job is set to "reading." Then, the routine returns. If the reading operation is not under suspension (NO at

S55), S552, it is discriminated that both the jobs are under suspension, and the routine returns. In the steps mentioned above, the current job is discriminated.

[0043]

Fig. 7 is a flowchart showing a subroutine of the key input processing of S405 shown in Fig. 4.

[0044]

Initially, at S60, it is discriminated whether the reservation setting key 306a is pressed. If the reservation setting key 306a is pressed (YES at S60), at S62, it is discriminated whether the current job is a "print job" and a sub-job is not being read (i.e., only a print job is being executed). If only a print job is being executed (YES at S62), at S63, the current job is set to "reading." Then, the routine returns. If it is not "only a print job is being executed" (NO at S62), the routine returns as it is.

[0045]

If the reservation setting key 306a is not pressed (NO at S60), at S61, input processing from the print key 301, the ten-key 302, the clear key 303, the stop key 304, the panel reset key 305 and the touch panel of the surface of the LCD 306, other than the reservation setting key 306a, is executed.

[0046]

Fig. 8 is a flowchart showing the subroutine of the displaying processing of S406 shown in Fig. 4.

[0047]

Initially, at S70, it is discriminated whether the current job is "reading." If the current job is "reading" (YES at S70), at S75, a display on the reading job is made. Then the routine returns.

[0048]

If the current job is not "reading" (NO at S70), at S71, it is discriminated whether the current job is "print." If the current job is "print" (YES at S71), at S76, a display on the print job is made. Then the routine returns.

[0049]

If the current job is no "print" (NO at S71), at S72, it is discriminated whether the entire copying machine 1 is in an error status. If the entire copying machine 1 is in an error status (YES at S72), at S77, a display on the entire error is made. Then, the routine returns.

[0050]

If the entire copying machine 1 is not in an error state (NO at S72), at S73, it is discriminated whether both the reading operation and the print operation are under suspension. If both operations are under suspension (YES at S73), at S78, a display showing that both operations are under suspension is made. Then, the routine returns.

[0051]

If both of the operations are not under suspension (NO at S73), at S74, a display showing that the copying machine 1 is in a standby mode (no job is being made by the copying machine 1). Then, the routine returns.

[0052]

As explained above, the copying machine 1 according to one embodiment of the present invention displays only a current job on the displaying portion. This displays either the reading job or the print job, a job in which the copying machine 1 is currently operating based on the inner status and the operations of the user, or a job to be operated by the user.

[0053]

By this, the operator conducting the operation can easily handle the image forming apparatus having a multi-job function.

[0054]

Furthermore, by changing the procedures of the CPU control as explained below, the displaying portion can be divided into a larger area and a smaller area, and simultaneously display the current job and the sub-job on the respective displaying portion.

[0055]

Fig. 9 is a plan view showing the structure of the LCD to be

divided a large area and a small area. A current job and a sub-job are displayed on the large area and the small area of the LCD 307 of this operation panel. Keys constituting an operation panel other than the LCD are similar to the aforementioned operation panel (Fig. 2). When any key other than the keys on the touch panel on the surface of the LCD 307 is pressed, the copying machine 1 discriminates that a key input is made to the current job displayed in the large area of the LCD 307.

[0056]

Such simultaneous displaying of the current job and the sub-job require an insertion of a routine of a sub-job discrimination processing in between the job discrimination processing of S404 and the key input processing of S405 in the flowchart shown in Fig. 4, and a change of the routine for the displaying processing of S406.

[0057]

Fig. 10 is a flowchart showing a subroutine for the sub-job discrimination processing to be inserted in between the subroutines of the job discrimination processing of S404 and the key input processing of S405 shown in Fig. 4.

[0058]

Initially, S90, it is discriminated whether the current job is "reading." If the current job is "reading" (YES at S90), at S91, it is discriminated whether it is being printed at that time. It is being printed (YES at S91), at S92, the sub-job is set to "print." Then, the routine returns. If it is not being printed (NO at S91), at S93, it is considered to be not "sub-job." Then, the routine returns.

[0059]

Next, if the current job is not "reading" (NO at S90), at S94, it is discriminated whether the current job is "print." If the current job is "print" (YES at S94), at S95, it is discriminated whether it is being reading at that time. If it is being read (YES at s95), at S96, the sub-job is set to "reading." Then, the routine

returns. If not being read (NO at S95), at S97, the sub-job is considered to be none. Then, the routine returns.

[0060]

Furthermore, if the current job is not "print" (the current job is not "reading") (NO at S94), (in the same manner as in the case of NO at S95), at S97, the sub-job is considered to be none. Then, the routine returns. The sub-job is considered to be none when it is discriminated that the current job is neither "reading" nor "print", i.e., when the job discrimination processing of S404 discriminated as the entire error stats of the copying machine 1, both the "reading operation" and the "print operation" are under suspension, and the machine is in a standby mode.

[0061]

Fig. 11 is a flowchart showing a subroutine of the displaying processing of the current job and the sub-job in place of the displaying processing of S406 shown in Fig. 4.

[0062]

Initially, at S1000, it is discriminated whether the current job is "reading." If the current job is "reading" (YES at S1000), at S1005, it is discriminated whether the sub-job is "print." If the sub-job is "print" (YES at S1005), at S1006, the reading job and the print job are displayed in the large area and the small area, respectively. Then, the routine returns. If the sub-job is not "print" (NO at S1005), at S1000, the reading job is displayed in the large area, and the display in the small area is deleted (nothing is displayed in the small area). Then, the routine returns. Here, in cases where the current job is "reading" and the sub-job is not "print," the sub-job cannot be "reading."

[0063]

If the current job is not "reading" (NO at S1000), at S1001, it is discriminated whether the current job is "print." If the current job is "print" (YES at S1001), at S1008, it is discriminated whether the sub-job is "reading." If the sub-job is "reading" (YES at S1008), at S1009, the print job and the reading job are displayed

in the large area and the small area, respectively. Then, the routine returns. If the sub-job is not "reading" (NO at S1008), at S1010, the print job is displayed in the large area, and the display in the small area is deleted. Then, the routine returns.

[0064]

If the current job is not "print" (NO at S1001), at S1002, it is discriminated whether it is in an entire error status. If it is in an entire error status (YES at S1002), at S1011, it is displayed that it is in an entire error status. If it is not an entire error status (NO at S1002), at S1003, it is discriminated whether both the two operations are in a suspension status. If both are in a suspension status (YES at S1003), at S1002, it is displayed that both of the "reading operation" and "print operation" are in a suspension status. If "both are not in a suspension status" (NO at S1003), at S1004, it is displayed that both are in a suspension status. Then, the routine returns.

[0065]

Thus, the operators can easily handle the image forming apparatus having a multi-job function.

[0066]

Fig. 12 is a flowchart of the subroutine of the discard processing of the current image data of S408 shown in Fig. 4. This flowchart shows the processing that if another image data is being read by the image reader IR when a command of discarding the currently printed data is generated, the reading operation is interrupted to perform the discard.

[0067]

First, at S121, it is determined whether the copying machine 1 is printing. If the copying machine 1 is printing (YES at S121), then it is determined at S122 whether the stop key 304 has been pressed to stop the copying operation. If the stop key 304 has been pressed (YES at S122), the reading operation and the printing operation are stopped at S123. If the copying machine 1 is not currently printing (NO at S121), or if the stop key 304 has not

been pressed (NO at S122) even if the copying machine 1 is printing, then this routine returns.

[0068]

Then, it is determined at S124 whether the current image data should be discarded, that is, it is determined whether the "clear" key has been pressed. If the image data is to be discarded (YES at S124), only the image data is discarded, and the image mode is maintained without discarding it (S125). Then, it is determined at S126 whether an output waiting job is to be printed. If the start key 301 is turned on to print the output waiting job (YES at S126), the printing operation is started at S127, and then this routine returns. If the waiting job is not to be printed (NO at S126), this routine also returns.

[0069]

If the current image data should not be discarded (NO at S124) after the reading operation and the printing operation were suspended at S123, it is determined at S128 if the interrupted printing operation is to be restarted. If in the case of restarting (YES at S128), the printing operation is restarted at S127. If the interrupted print job does not have to be restarted (NO at S128), the process returns to S124.

[0070]

Fig. 13 shows a flowchart showing a second subroutine of the discard processing of the image data at S408 shown in Fig. 4. This flowchart shows the processing that if another image data is being read by the image reader IR when a command of discarding the currently printed data is generated, the reading operation is completed first, and then, the currently output image data is discarded.

[0071]

The flowchart shown in Fig. 13 is different from the flowchart shown in Fig. 12 as follows. In the flowchart shown in Fig. 12, if the stop key 304 is ON (YES at S122), the reading operation and the printing operation are interrupted. To the contrary, in the flowchart shown in Fig. 13, only the printing operation is stopped

at S123-1, and the reading operation is continued until it is completed at S123-2. In other words, after the printing operation is stopped at S123-1, it is determined at S123-2 whether another image data is being read. If another image data is not being read (NO at S123-2), the process proceeds to S124, in which it is determined whether the image data is to be discarded. If it is being read (YES at S123-2), the process remains at S123-2.

[0072]

In Fig. 13, other steps other than at S123-1 and S123-2 are the same as those at each step in the subroutine shown in Fig. 12, and therefore the explanation will be omitted by allotting same step number.

[0073]

Fig. 14 is a flowchart of the subroutine of reloading processing of image data shown at S409 in Fig. 4.

[0074]

First, at S1401, it is determined whether the image mode is maintained as it is. If the image mode is maintained (YES at S1401), the call key for reading out the image mode of the discarded job at S1421 is displayed on the LCD panel 306. If the image mode is not maintained (NO at S1401), this routine returns.

[0075]

At S1403, it is determined whether the call key for the image mode has been pressed. If the call key has been pressed (YES at S1403), it is determined at S1404 if the image mode is to be changed. If the image mode is to be changed (YES at S1404), the image mode is changed through the key inputs or the like at S1405. Then, at S1406, it is determined whether the reloading operation for the image data is to be started. If the image mode is not to be changed (NO at S1404), it is discriminated whether the reloading operation for the image data is to be started as it is at S1405.

[0076]

If the reloading of the image data is to be started (YES at S1406), the reloading of the image data is performed by the image

reader IR at S1407. Then, at S1408, output processing is performed at the corresponding image mode which has been changed or maintained without being changed to print the reloaded image data. If the reloading of the image data is not performed (NO at S1406), the process stays at this step until the reloading is started.

[0077]

After the image data is output, it is determined at S1409 whether there are any output waiting jobs. If there are output waiting jobs (YES at S1409), these are printed at S1410, and this routine returns. If there is no output waiting job (NO at S1409), this routine also returns.

[0078]

In this manner, priority is given to the reloading of the image data over the output waiting jobs.

[0079]

Fig. 15 illustrates a display sequence on the LCD panel when the currently printed image data is discarded. G151 shows a screen in which the outputting operation is going on. G152 shows a screen in which the stop key 304 is pressed and the outputting operation is interrupted. This screen allows the user to select discarding or not discarding the image data. In this example, the screen shows the key for calling the image mode of the discarded job. G155 shows a screen in which there are still output waiting jobs after discarding the image data. In this example, an output waiting job start message is displayed to initiate the job. G156 shows a screen in which no image data is to be discarded and the output operation is continued.

[0080]

Fig. 16 illustrates schematic view showing a sequence of operation states from the discard of the image data to the completion of the re-output operation.

[0081]

In state 1, job (1) is being reading, job (2) is on the output waiting list, and job (3) is being output. If the stop key 304 is turned ON, the state transits to State 2, in which job (1) and job

(3) are interrupted. If job (3) is discarded, the state transits to State 3. The image mode selected for job (3) is called, and the image data is read again (reading job (4)) (State 4). In State 4, the job (1) and the job (2) are in a standby status, and priority is given to the job (4). After the completion of the reading of the job (4), the outputting operation is executed prior to the job (2) (State 5). After the output completion of the job (4), the operation of the job (2) which has been in a standby status is resumed, and the operation of the job (1) is also resume.

[0082]

Fig. 17 is a schematic view showing an example of the sequence of operations from the discard of the image data to the completion of the re-outputting operation.

[0083]

In state 1, job (1) is being read, job (2) is on the output waiting list, and job (3) is being output. If the stop key 304 is turned ON, the state transits to State 2, in which job (1) and job (3) are interrupted. If job (3) is discarded, the state transits to State 3. The image mode selected for job (3) is called, and that image mode is changed. After the image mode was changed, the image data is read again as the job (3) (State 4). In State 4, job (1) and job (2) are in a standby status, and the job (3) is processed preferentially. When the reading operation of job (3) is completed, the outputting operation of the job (3) is executed prior to the job (2) (State 5). After the completion of the outputting of the job (3), the job (2) which was in a standby status resumes, and the operation of the job (1) also resumes.

[0084]

Fig. 18 is a flowchart showing the subroutine of the discard processing for a print-waiting job shown at S410 in Fig. 4.

[0085]

First, it is determined at S181 whether there are any jobs on the print waiting list. If there are waiting jobs (YES at S181), it is determined at S 182 whether the waiting job is to be discarded.

If a waiting job is to be discarded (YES at S182), both the image data and the image mode for that job are discarded at S183, and this routine returns. In cases where there is no waiting job (NO at S181) or none of the waiting jobs is to be discarded (NO at S182), this routine also returns.

[0086]

In the embodiment explained above, although the image forming apparatus having a multi-job function which allows the reading means and the outputting means to operate independently each other has been described, the invention also covers image forming apparatuses without a multi-job function and the image forming conditions (image mode) is maintained without discarding it. Furthermore, although the image reader IR is used as an input unit for the original image, externally connected computers or facsimile machines can also be used as input units.

[0087]

[Effects of the invention]

According to the invention as recited in claim 1, even if image data being outputted is discarded by the image data discarding means, the corresponding image mode stored in the image mode storing means remains as it is. Therefore, the image data can be quickly outputted by simply reloading the image data without requiring resetting of the image mode, resulting in a convenient image forming apparatus excellent in efficiency and operability.

[0088]

Especially, in a image forming apparatus as recited in claim 2 further comprising reading means for reading the image data in the image data storing means, which is capable of independently operating the reading means and the outputting means, the operability become more effective.

[0089]

According to the invention as recited in claim 3, the image forming apparatus further comprises image mode calling means for calling the image forming conditions, wherein the image data which

was discarded with the image data discarding means and again read with the reading means is outputted in priority to the output waiting image data under the corresponding image forming conditions called up with the image mode calling means. Therefore, the re-loaded image data can be obtained promptly without waiting the output of the out-put-waiting image data, which further improves the operability.

[0090]

According to the invention as recited in claim 4, when the image data is discarded with the image data discarding means, if another image data is being read with the reading means, the reading operation is interrupted and the discarded image data becomes available to be reloaded. Therefore, the discarding, re-loading and outputting of the image data can be performed consecutively, which is especially very convenient when the output of the discarded image data is expected.

[0091]

According to the invention as recited in claim 5, when the image data is discarded with the image data discarding means, if another image data is being read with the reading means, the reading operation is continued until the completion of the reading operation and thereafter the discarded image data becomes available to be reloaded. Therefore, it is not required to reload the image data that the reading was interrupted after the reloading of the discarded image data, resulting in an efficient operability, which improves the efficiency.

[0092]

According to the invention as recited in claim 6, the stored image mode can be changed by calling up the stored image mode, which further improves the operability.

[Brief explanation of the drawings]

[Fig. 1]

Fig. 1 is a schematic cross-sectional view showing a schematic structure of a copying machine 1 with a multi-job function.

[Fig. 2]

Fig. 2 is a plan view showing a structure of the operation panel 300 of the copying machine 1.

[Fig. 3]

Fig. 3 is an explanatory view showing the multi-job operation of the copying machine 1.

[Fig. 4]

Fig. 6 is a flowchart of the main routine executed by the CPU which controls the overall operations of the copying machine 1.

[Fig. 5]

Fig. 5 is a first flowchart showing the subroutine of the job discrimination processing at S404 shown in Fig. 4.

[Fig. 6]

Fig. 6 is a second flowchart showing the subroutine of the key input processing at S405 shown in Fig. 4.

[Fig. 7]

Fig. 7 is a flowchart showing the subroutine of the key input processing at S405 shown in Fig. 4.

[Fig. 8]

Fig. 8 is a first flowchart showing the subroutine of the display processing at S406 shown in Fig. 4.

[Fig. 9]

Fig. 9 is a plan view showing the structure of the operation panel having a display portion capable of being divided into a large area and a small area.

[Fig. 10]

Fig. 10 is a flowchart showing the subroutine of the sub-job discrimination processing to be inserted in the subroutine of the job discrimination processing at S404 and the key input processing at S405 shown in Fig. 4.

[Fig. 11]

Fig. 11 is a flowchart showing the subroutine of the display processing of the current job and the sub-job in place of the display processing at S406 shown in Fig. 4.

[Fig. 12]

Fig. 12 is a flowchart showing the subroutine of the image data discard processing at S408 shown in Fig. 4.

[Fig. 13]

Fig. 13 is a flowchart showing another subroutine of the image data discard processing at S408) shown in Fig. 4;

[Fig. 14]

Fig. 14 is a flowchart of the subroutine of the image data reloading processing at Step S408) shown in Fig. 4.

[Fig. 15]

Fig. 15 is a display transition view of the liquid crystal display when the image data is to be discarded.

[Fig. 16]

Fig. 16 is a schematic view showing an example of the operation flow from the discard of the image data to the completion of the re-outputting operation.

[Fig. 17]

Fig. 17 is a schematic view showing another example of the operation flow from the discard of the image data to the completion of the re-output operation.

[Fig. 18]

Fig. 18 is a flowchart showing the subroutine of the print waiting job discard processing at S410) shown in Fig. 4.

[Description of the reference numerals]

1...copying machine
10...scanning system
20...signal processing portion
30...storing portion
40...print processing portion
60...optical system
70...image forming system
80...paper supplying system
300...operation panel
301...start key
302...ten-key

303...stop key

305...panel reset key

306, 307...LCD

IR...image reader

PRT...printer

[Name of document] Abstract

[Abstract]

[Problems] To provide an image forming apparatus capable of using an original setting mode regarding an image mode in cases where image data being output is deleted and re-inputted image data is to be outputted

[Means to solve the problems] Even if image data being outputted is discarded with the image data discarding means, the corresponding image mode stored in the image mode storing means remains as it is. Therefore, the image data can be outputted by simply re-loading the image data without requiring resetting of the image mode. Preferably, the image data which was discarded with the image data discarding means and again read with the reading means is outputted in priority to the output waiting image data under the corresponding image forming conditions called up with the image mode calling means.

[Selected drawing] Fig. 14

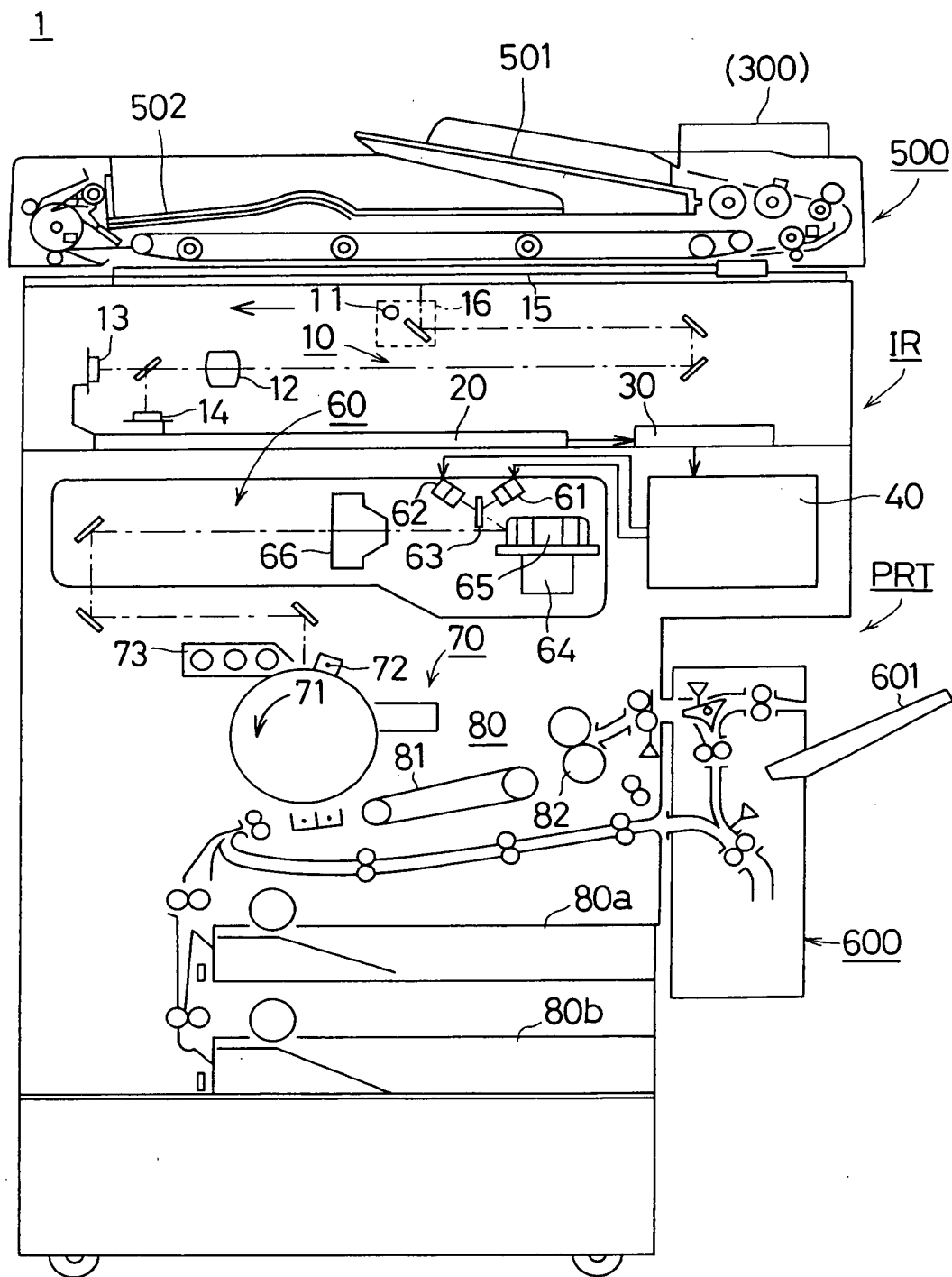


FIG. 1

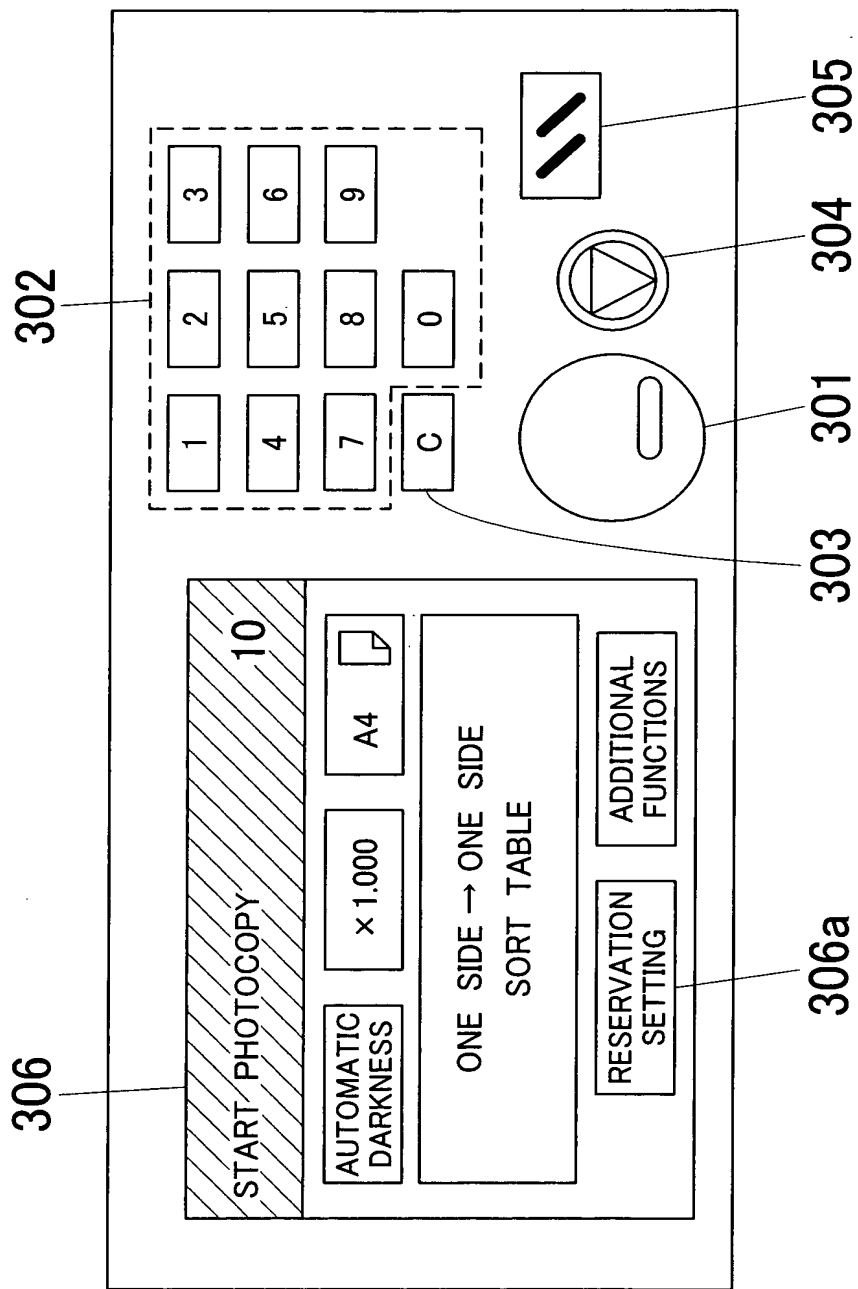
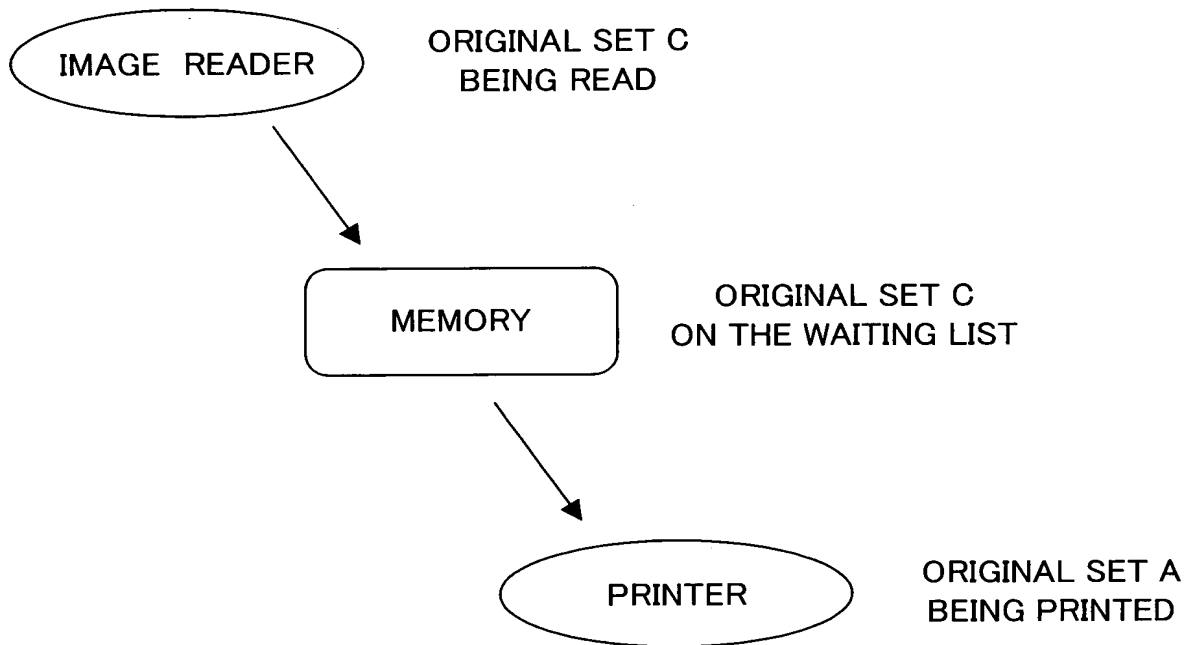


FIG. 2



→ : IMAGE DATA FLOW

FIG.3

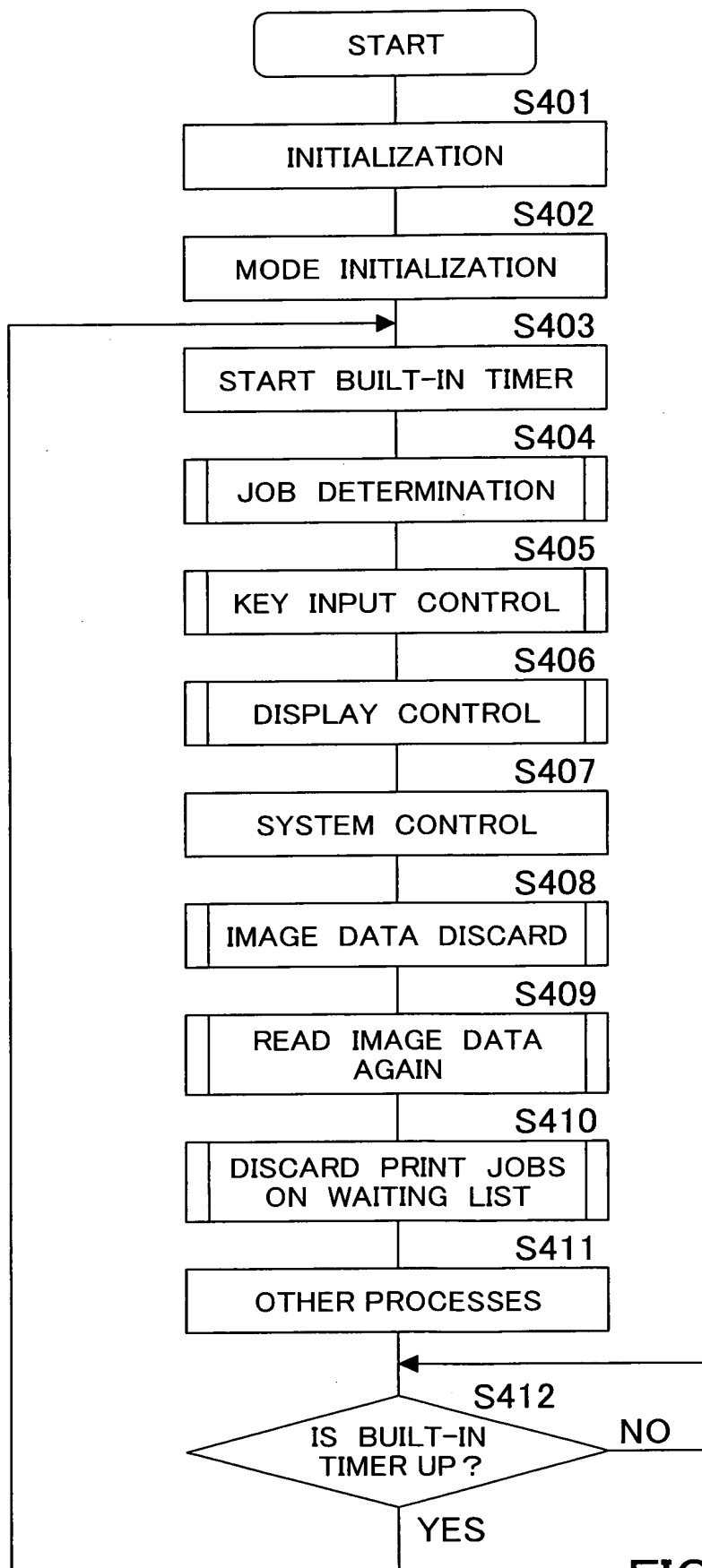


FIG.4

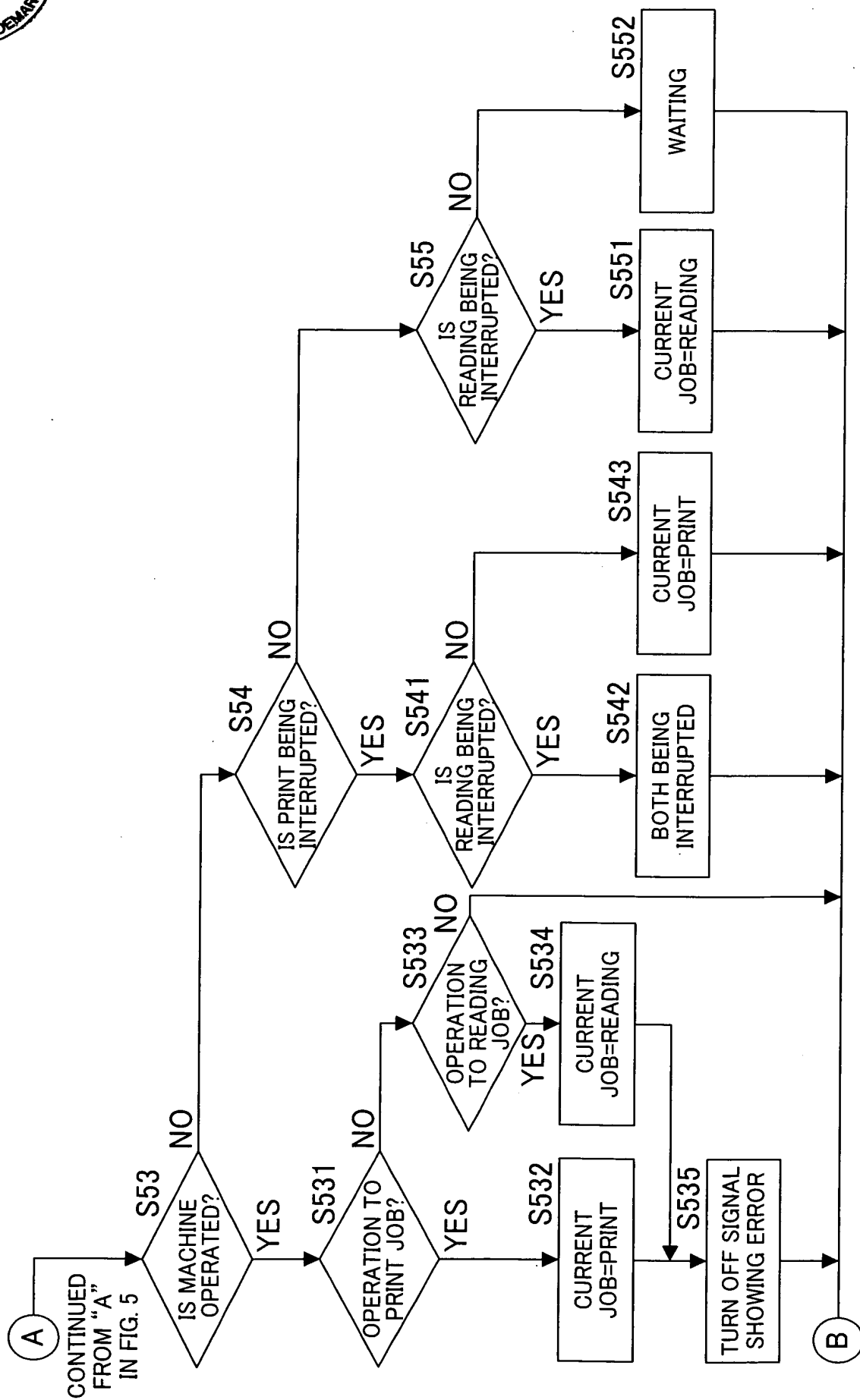


FIG. 6

CONTINUED FROM "B" IN FIG. 5

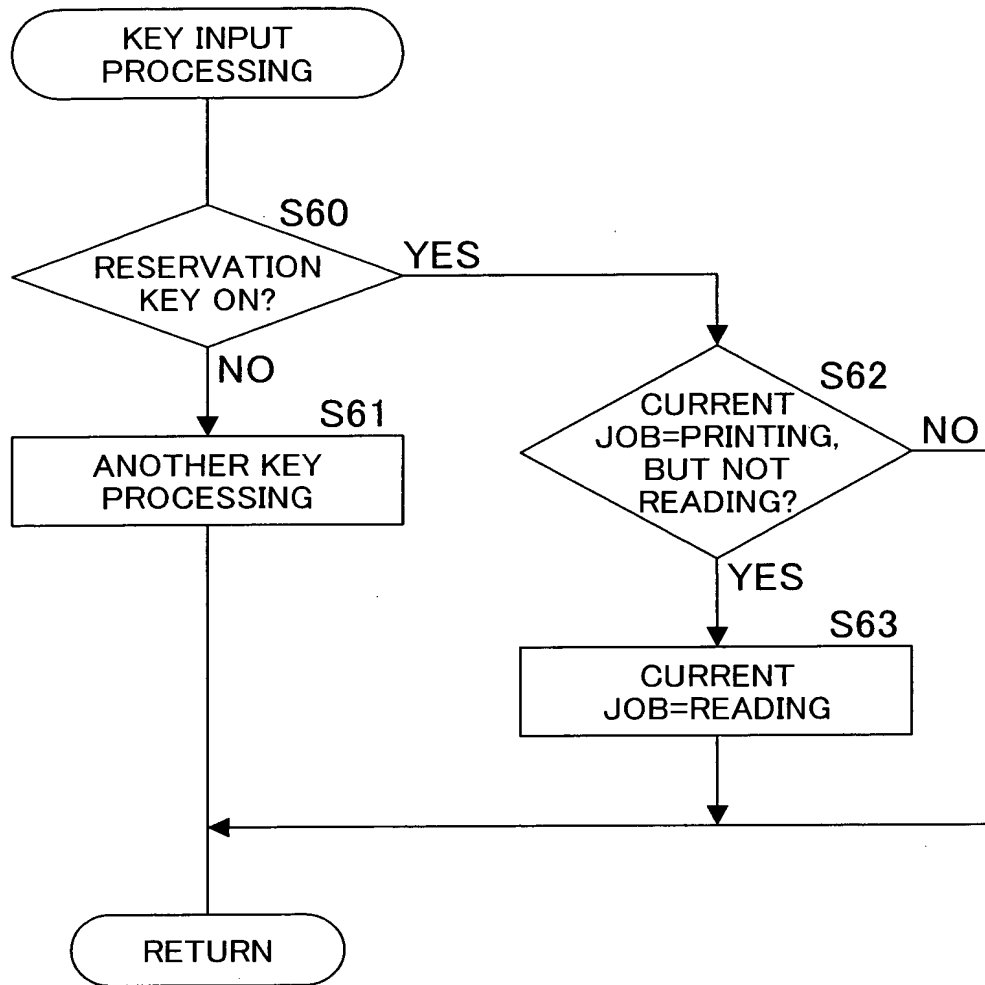


FIG.7

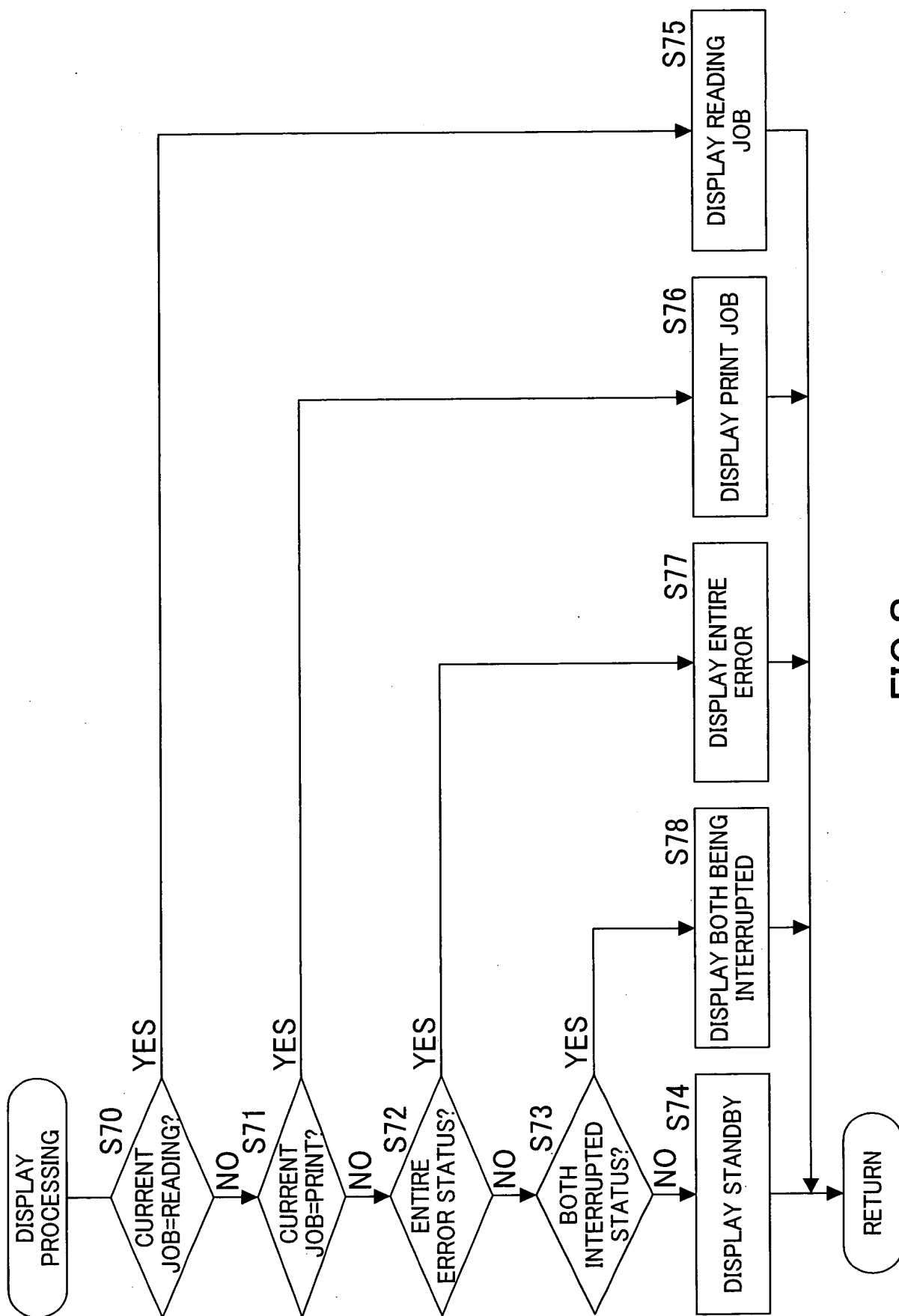


FIG.8



307

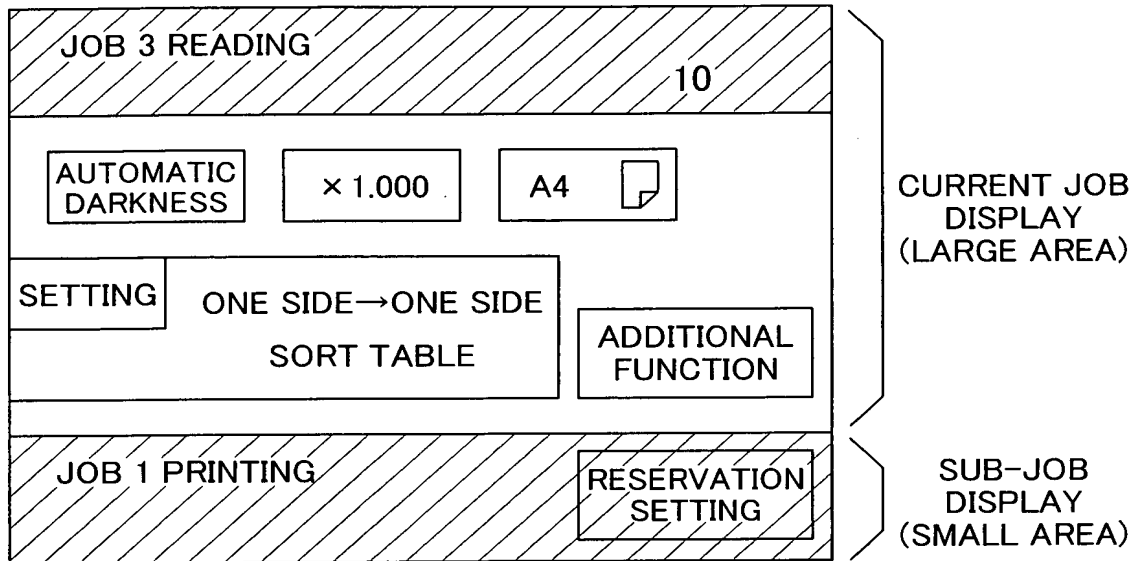


FIG.9

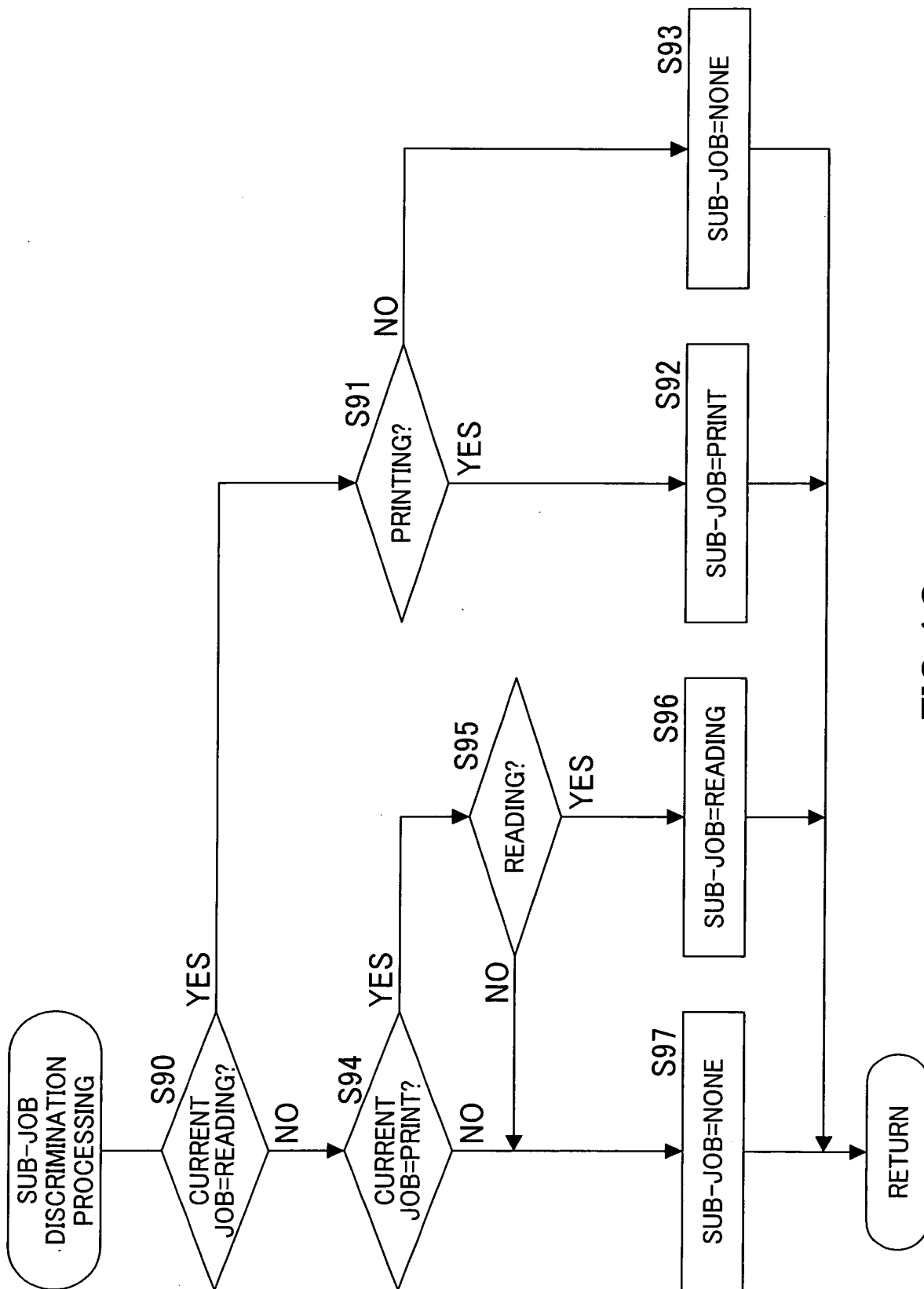


FIG.10

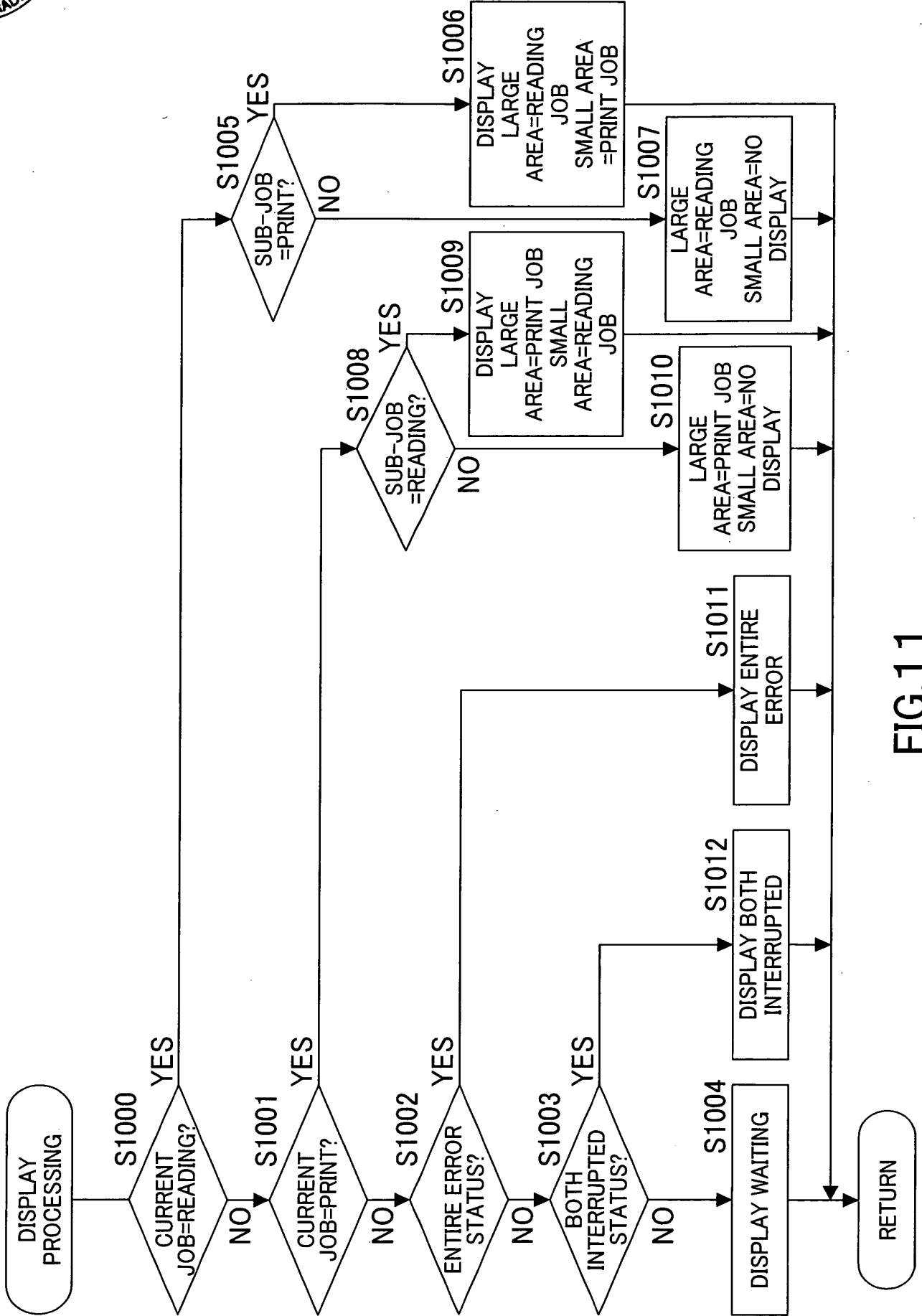


FIG.11

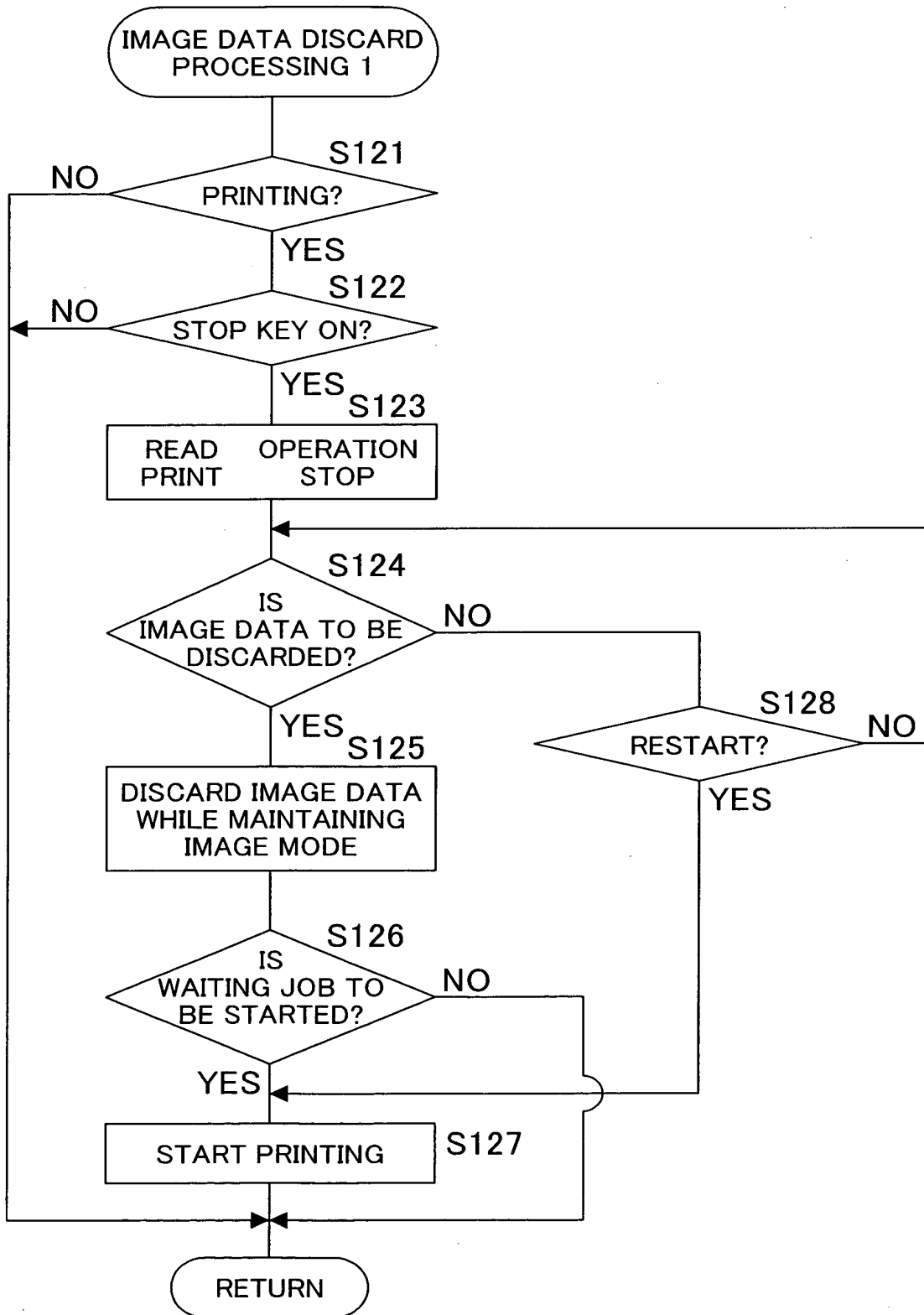


FIG.1 2

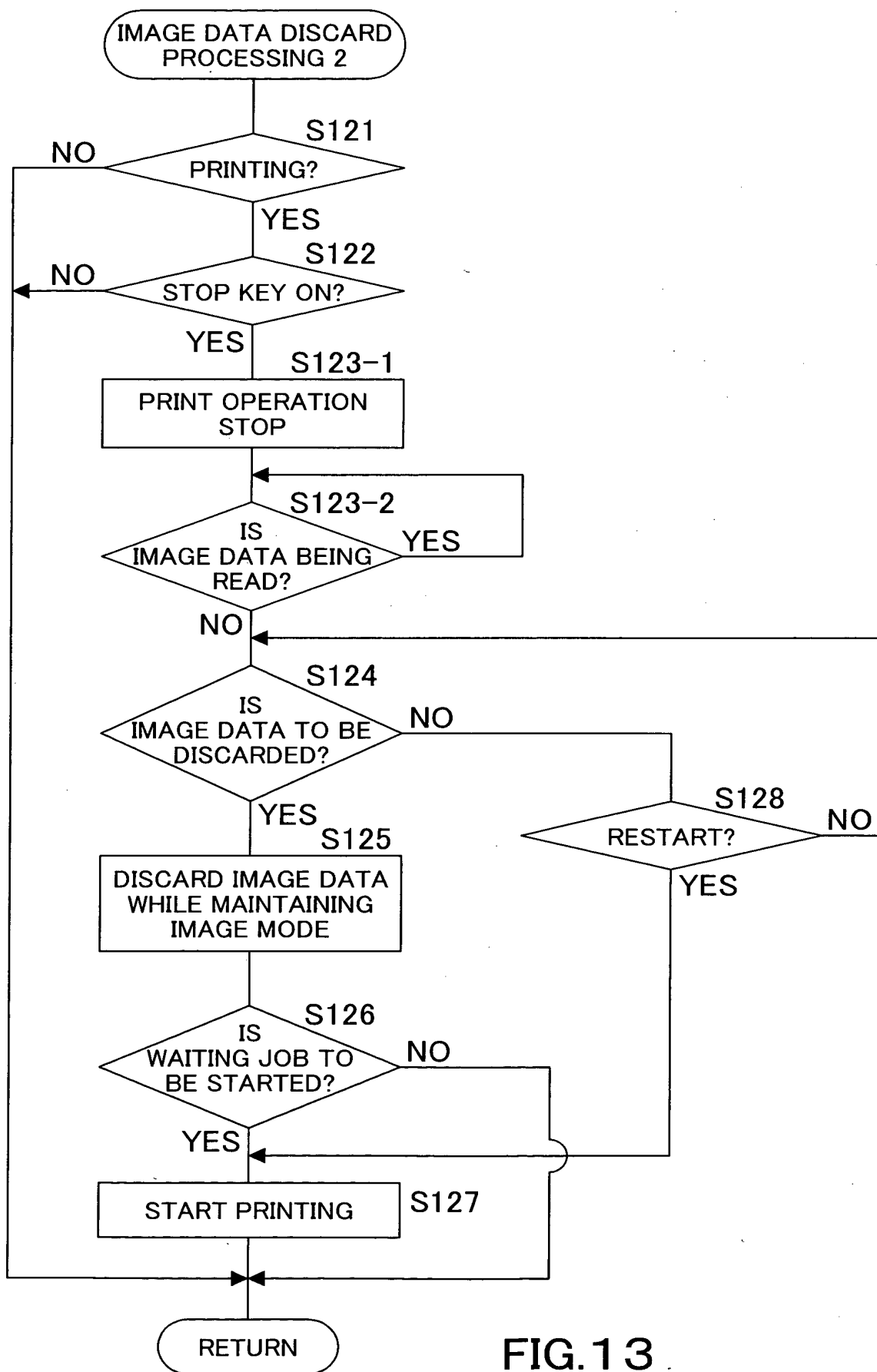


FIG.13

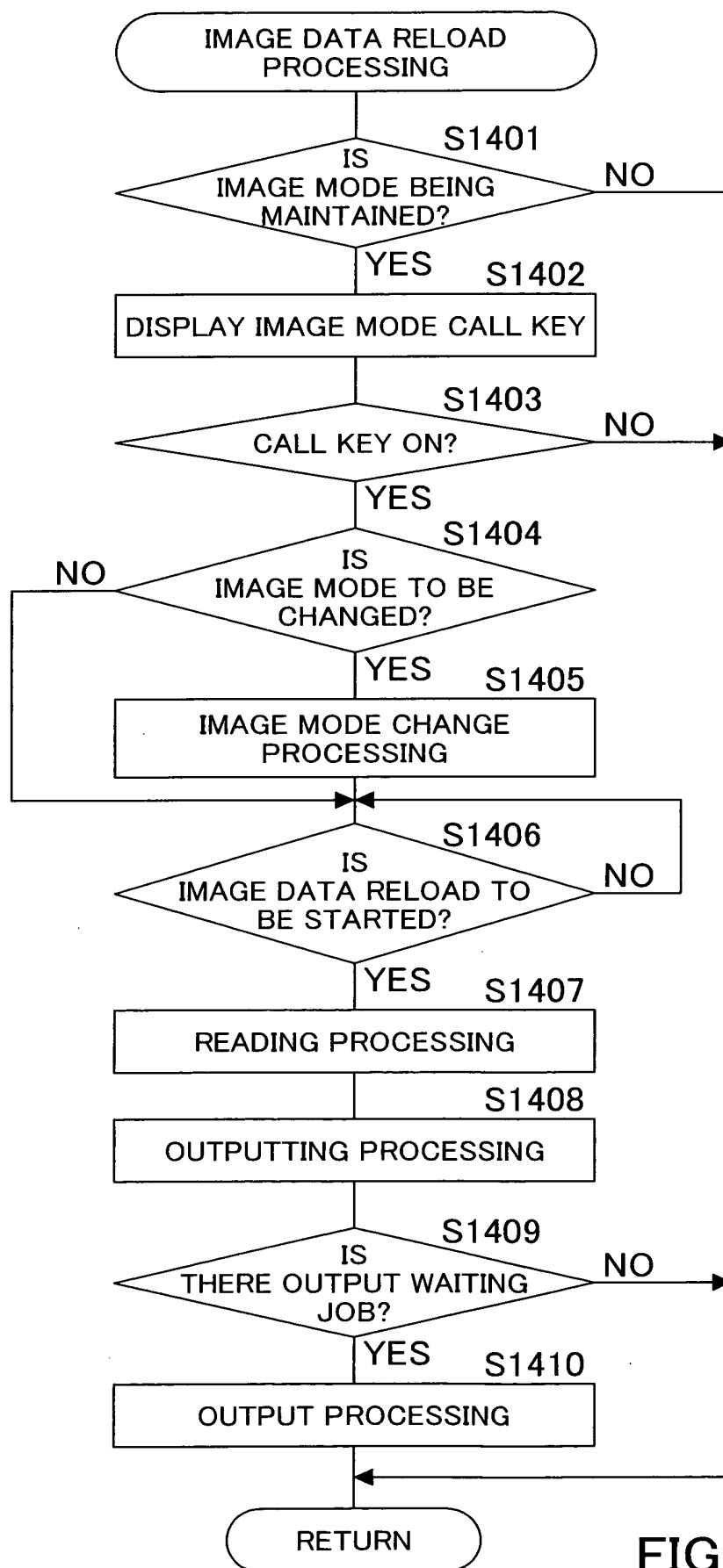


FIG. 14

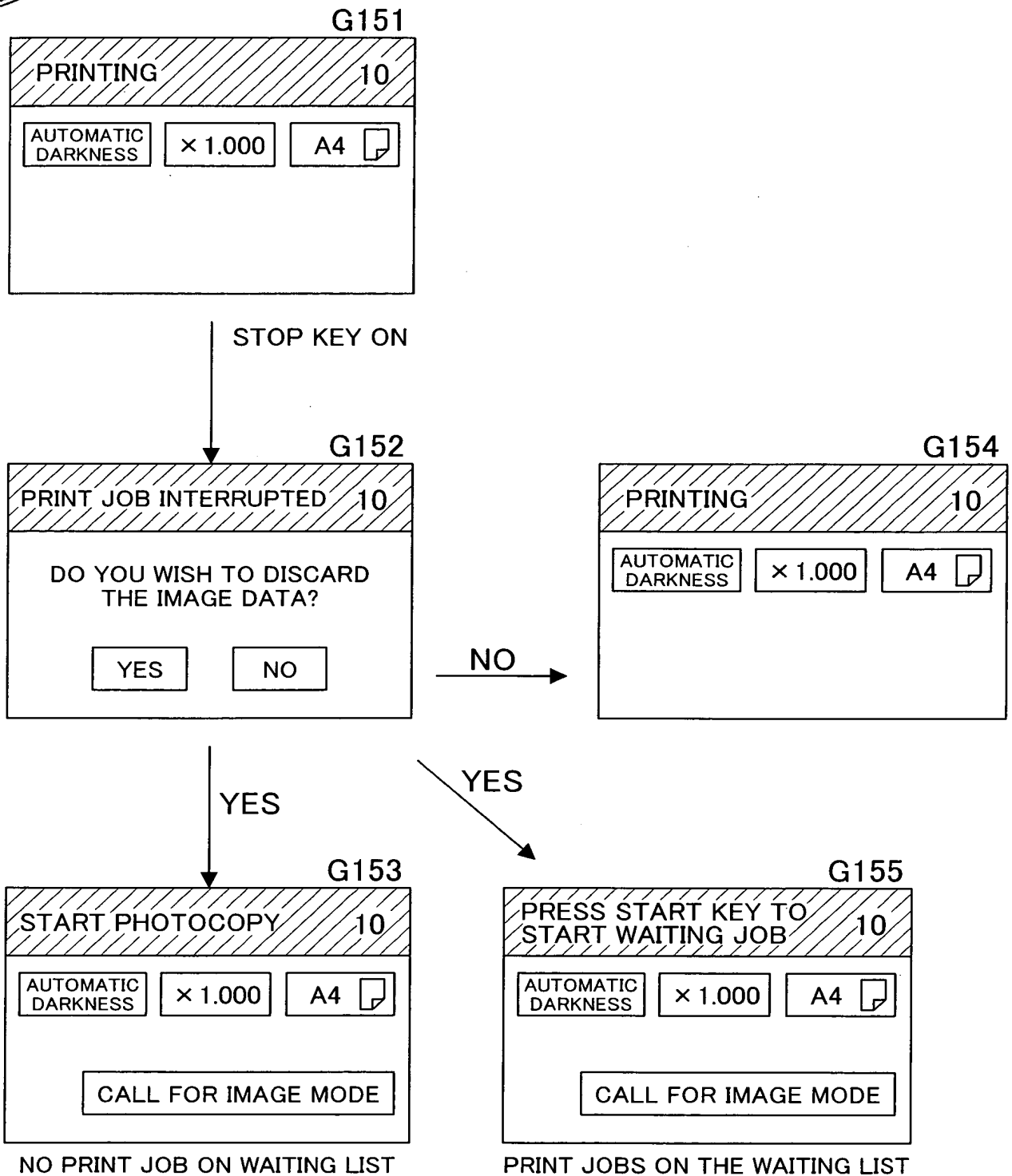


FIG.15



STATE 1

JOB① BEING READ

JOB② ON OUTPUT WAITING LIST

JOB③ BEING OUTPUT

STOP KEY ON

STATE 2

READING JOB① BEING SUSPENDED

JOB② ON OUTPUT WAITING LIST

OUTPUT JOB③ BEING SUSPENDED

DISCARD OUTPUT JOB③

STATE 3

READING JOB① BEING SUSPENDED

JOB② ON OUTPUT WAITING LIST

CALL IMAGE MODE FOR JOB③

STATE 4

READING JOB① BEING SUSPENDED

JOB② ON OUTPUT WAITING LIST

READING JOB④ IN THE CALLED
IMAGE MODE FOR JOB③

FINISH READING JOB④

STATE 5

READING JOB① BEING SUSPENDED

JOB② ON OUTPUT WAITING LIST

OUTPUT JOB④

FINISH OUTPUTTING JOB④

STATE 6

RESTART READING JOB①

OUTPUT JOB②

FIG.1 6



STATE 1

JOB① BEING READ

JOB② ON OUTPUT WAITING LIST

JOB③ BEING OUTPUT

STOP KEY ON

STATE 2

READING JOB① BEING SUSPENDED

JOB② ON OUTPUT WAITING LIST

OUTPUT JOB③ BEING SUSPENDED

DISCARD OUTPUT JOB③

STATE 3

READING JOB① BEING SUSPENDED

JOB② ON OUTPUT WAITING LIST

CALL IMAGE MODE FOR JOB③

STATE 4

READING JOB① BEING SUSPENDED

JOB② ON OUTPUT WAITING LIST

RESTART READING JOB③
AFTER CHANGING THE MODE
FOR CALLED JOB③

FINISH READING JOB③

STATE 5

READING JOB① BEING SUSPENDED

JOB② ON OUTPUT WAITING LIST

OUTPUT JOB③

FINISH OUTPUTTING JOB③

STATE 6

RESTART READING JOB①

OUTPUT JOB②

FIG.17

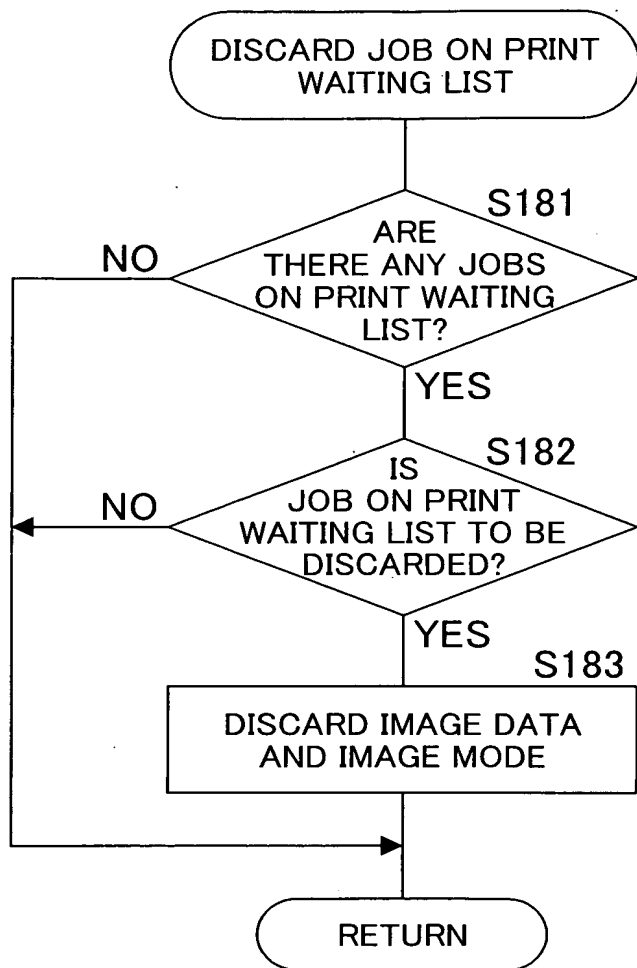


FIG.18